REMARKS

Re-examination and reconsideration of the rejections are hereby requested.

The present invention is a receiver for processing multi-signature signals having undergone some distortion such as by the addition of noise. The receiver of the invention mitigates both the effects of multi-user interference and white noise while requiring knowledge of only the signature signals.

In one aspect, according to claim 1, the receiver includes a bank of correlators for receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion and a correlation shaper operating on a vector output from the bank of correlators. Similarly, independent method claim 27 includes the steps of receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion, processing the received signal to obtain a vector output and then shaping the correlation of the vector output.

The bank of correlators may comprise a decorrelator receiver or a matched filter receiver and the correlation shaper may be a whitening transformation.

An embodiment of the invention is shown in Fig. 1. A signal 20 that is a linear combination of a set of signature signals and a noise component is received and processed by a bank of correlators 30. The received signal is cross correlated with signals 90 so that a vector output is produced. The vector output is then shaped by a correlation shaper 50 and the vector output 60 of the correlation shaper 50 is optionally passed to a detector 70. As stated in the specification on page 5, each user in a system contemplated by the present invention is associated with one of a set of signature signals which distinguishes that particular user's signal from all of the signals propagating within the system.

To assist in signal detection, the receiver must process the received signal and distinguish an individual signature signal from among the linear combination of the distorted signature signals it receives.

The receiver and method of signal processing according to the present invention allows

the design of a specific correlation shape for the vector output of a bank of correlators. In this way, the present invention simultaneously compensates for white noise and exploits the structure of multi-signature interference.

Claims 1, 2, 14-27 and 13-48 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Bottomley, *et al.*, U.S. Patent No. 6,801,565. Bottomley relates to a spread spectrum communications method and apparatus in which information encoded in a spread spectrum signal transmitted in a communications medium is recovered. In particular, a spread spectrum signal is correlated with a desired spreading sequence and the resulting correlations are subjected to a multi-stage combining process in which respective groups of correlations are combined to produce intermediate combined values that have subsequently been combined in a manner that compensates for correlated impairment in the composite signal.

As discussed above, the receiver of the invention according to claim 1 recites a bank of correlators for receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion. Nowhere does Bottomley disclose that the received signal is a linear combination of a set of signature signals. This limitation is entirely missing from Bottomley and therefore the 35 U.S.C. § 102(e) rejection is improper. Furthermore, claim 1 requires a correlation shaper operating on a vector output from the bank of correlators and this aspect is also missing from Bottomley. The Examiner refers to channel compensating elements 420a and 420b and impairment compensating means 450 and asserts that they constitute a correlation shaper "by removing errors in the signal". It is submitted that the elements 420a, 420b, and 450 do not constitute a correlation shaper set forth in the claims.

With respect to a least mean square (LMS) algorithm, the Examiner states that the processes take place "in elements 214, 218, 222 and 224 in figure 2." Clarification is requested in that these reference numbers cannot be found in figure 2 of the Bottomley patent nor, in fact, in any of the figures in the Bottomley patent.

Since the Bottomley reference does not teach a bank of correlators for receiving a signal that is a linear combination of a set of signature signals that has undergone some distortion nor does it teach a correlation shaper operating on a vector output from the bank of correlators, it is submitted that claims 1, 2, 14-27, 37-48 are in condition for allowance.

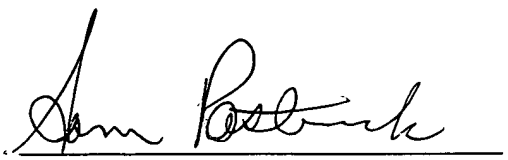
Claim 3 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of disclosed prior art. Claim 3 depends from claim 1 and is therefore allowable for the reasons set forth above with respect to claim 1.

Claims 4-6, 9-11, 27-30, 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of Huang et al, US patent 6,067,292. The Examiner acknowledges that Bottomley does not disclose shaping the correlation by minimizing the mean square error and cites Huang to meet that limitation stating that minimizing the mean square error takes place in a correlation shaper. The pilot cancellation scheme illustrated in figure 6 of Huang is not a correlation shaper and thus neither Bottomley nor Huang disclose a correlation shaper. Reconsideration is requested.

Claims 7, 8, 12, 13, 31, 32, 35 and 36 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of Heikkila, US 2002/0122470. The Examiner acknowledges that Bottomley does not disclose shaping the correlation by performing a transformation on the output so that the covariance matrix has the property that the second row is a permutation of the first row. To meet this limitation, the Examiner refers to figure 8, and to paragraph 0106 of Heikkila. The Examiner states that the output of conversion block 46 is input to element 30. The block 46 is merely an analog demodulator that demodulates an RF signal to baseband and processes it as needed to form a baseband signal. We note that these claims depend from independent claims that are allowable for the reasons discussed earlier.

For the foregoing reasons, it is submitted that the pending claims are in condition for allowance and early favorable action is requested.

Respectfully submitted,



Sam Pasternack
Registration No. 29,576

Date: June 3, 2005

PATENT GROUP
CHOATE, HALL & STEWART LLP
53 State Street
Exchange Place
Boston, MA 02109
Telephone: (617) 248-5000
Facsimile: (617) 248-4000